

by the 29th, after which it disappeared to the northeastward beyond the region of observation.

The following special reports have been rendered relative to disturbances encountered within the area of this depression:

Capt. W. Abbott, of the s. s. "Marengo," reports: "27th, 4 p. m. to 28th, 2 a. m., experienced a hurricane in N. 44° 42', W. 51° 56'; wind veered from s. through sw. and w. to wnw; barometer lowest at 7 p. m. of the 27th." Capt. J. Uberweg, of the s. s. "Waesland," reports a whole northerly gale on the 27th; lowest barometer, 29.20 (741.7), at 8.30 p. m., in N. 44° 35', W. 56° 29'. The gale was accompanied by heavy rain. Capt. P. Slierendregt, of the s. s. "Leerdam," reports a whole gale from se., veering to wsw., during the 27th and 28th; lowest barometer, 29.30 (744.2), at 10 p. m. of the 27th, in N. 46° 50', W. 47° 35'. Capt. R. Wills, of the s. s. "British Queen," reports a whole gale to hurricane during the 27th and 28th; wind set in from ne. and veered to sse. at noon of the 27th, in N. 46° 24', W. 48° 8', and during p. m. to nw., from which direction it blew a hurricane, with violent squalls and mountainous seas; lowest barometer, 29.44 (747.8), from 10 to 11 p. m. of the 27th. Chief Officer Kinning, of the s. s. "Roman," Capt. D. Williams, commanding, reports a gale from sw., force 9, at 4 a. m. of the 27th, in N. 44° 29', W. 53° 0'; barometer 29.05 (737.9).

Capt. W. Rippeth, of the s. s. "Otranto," reports a hurricane on the 27th from sse., veering to nw.; lowest barometer, 29.64 (752.8), in N. 42° 18', W. 55° 41'. Third Officer J. H. Mills, of the s. s. "Aurania," Capt. W. H. P. Hains, commanding, reports: "27th, between N. 43° 16', W. 54° 45' and N. 43° 39', W. 53° 12', and between the hours of 8 p. m. and 12 midnight, Greenwich mean time, experienced a storm; wind shifted from s. to w. and nw., with thick mist and rain; for about two hours it blew a hurricane from the w. and abated about midnight; lowest barometer, 29.28 (743.7), at 8 p. m., and at midnight it had risen to 29.59 (751.6).

Capt. B. Gleadell, of the s. s. "Germanic," reports a strong gale from se. veering to nw. during the 27th and 28th; lowest barometer, 29.65 (753.1), at 4.15 a. m. of the 28th, in N. 48° 50', W. 40° 50'.

During the 30th the presence of a depression of considerable energy was indicated to the northward of the Banks of Newfoundland, but its course lay too far to the northward of the region of observation to allow of accurately locating its centre.

#### OCEAN ICE.

No icebergs have been reported during the month.

In December, 1885, several icebergs were observed on the Newfoundland coast, and over the Banks during the latter portion of the month.

For December of the three preceding years no icebergs were reported.

#### FOG.

The following shows the limits of fog-areas encountered on the north Atlantic Ocean during December, 1886, as reported by shipmasters:

1st.—The s. s. "Fulda," from N. 45° 0', W. 51° 30' to N. 43° 0', W. 57° 0', had dense fog, continuing from 8 a. m. to midnight; winds southerly; barometer about normal.

8th.—The s. s. "Siberian" had dense fog from 1 a. m. to 3 a. m., in N. 43°, W. 62°; wind strong from e. to s.; barometer considerably below the normal.

17th.—The s. s. "Palestine" had dense fog from 8 a. m. to 11 a. m., in N. 45° 51', W. 51° 24'; winds southerly; pressure below the normal.

20th.—The s. s. "Cephalonia" had dense fog during p. m., in N. 45° 40', W. 48° 0'. The s. s. "Bavarian" had dense fog from 10 to 11 p. m., in N. 44° 01', W. 48° 51'; winds southerly; pressure about normal.

From above reports it will be seen that fog was encountered during the month over, and to the southwestward of, the Banks of Newfoundland, with southerly winds and barometric pressure about, or below, the normal. As in the preceding

month (November, 1886), the conditions favorable to the development of fog seemed to exist to the eastward of barometric depressions.

#### TEMPERATURE OF THE AIR.

[Expressed in degrees, Fahrenheit.]

The distribution of mean temperature over the United States and Canada for December, 1886, is exhibited on chart ii by the dotted isothermal lines; and in the table of miscellaneous data are given the monthly mean temperatures, with the departures from the normal, for the various stations of the Signal Service. On chart iv the departures from the normal temperature are illustrated by lines connecting stations of normal or equal abnormal values.

In northeastern Montana and in all districts, except the Rio Grande Valley, from the one hundred and fifth meridian eastward, the temperature of the air for the month has been decidedly lower than the average December; the departures are especially large in Dakota, Minnesota, the Missouri Valley, and the upper Mississippi valley, the mean temperature of the air at Signal Service stations within these districts averages 7°.7 below the normal; in Minnesota and eastern Dakota the month has been 10°.0 colder than the average December. In the Lake regions, the Ohio Valley, and Tennessee, the departures average about six degrees below the normal. From the one hundred and fifth meridian westward the temperature of the month has been above the normal; the larger departures within this area occur in Washington Territory, Oregon, Idaho, and Nevada, where they range from 5°.7 at Boise City, Idaho, to 4°.4 at Olympia, Washington Territory. It is worthy of note in this connection that the area of greatest departure below the normal coincides with the area of maximum pressure.

The following are some of the most marked departures from the normal temperature at Signal Service stations:

Above normal.		Below normal.	
	°		°
Denver, Colorado.....	6.5	Moorhead, Minnesota.....	11.1
Boise City, Idaho.....	5.7	Huron, Dakota.....	10.6
Roseburg, Oregon.....	5.4	La Crosse, Wisconsin.....	10.4
Fort Grant, Arizona.....	5.4	Bismarck, Dakota.....	10.0
Winnemucca, Nevada.....	5.1	Davenport, Iowa.....	9.8
Helena, Montana.....	4.9	Dubuque, Iowa.....	9.6
Fort Davis, Texas.....	4.8	Duluth, Minnesota.....	7.6
Portland, Oregon.....	4.6	Keokuk, Iowa.....	7.4

In the following table are given the mean temperatures for the several geographical districts, with the normals and departures, as deduced from Signal Service observations:

#### Average temperatures for December.

Districts.	Average for December, Signal-Service observations.		Comparison of Dec., 1886, with the average for several years.
	For several years.	For 1886.	
New England.....	30.4	27.3	— 3.1
Middle Atlantic States.....	36.9	32.0	— 4.9
South Atlantic States.....	48.6	45.5	— 3.1
Florida Peninsula.....	61.4	58.1	— 3.3
Eastern Gulf States.....	49.9	46.0	— 3.9
Western Gulf States.....	50.0	46.8	— 3.2
Rio Grande Valley.....	60.1	61.1	+ 1.0
Tennessee.....	41.4	36.2	— 5.2
Ohio Valley.....	35.1	28.7	— 6.4
Lower Lake region.....	39.1	24.0	— 15.1
Upper Lake region.....	24.3	18.6	— 5.7
Extreme Northwest.....	10.2	2.7	— 7.5
Upper Mississippi Valley.....	28.0	20.6	— 7.4
Missouri Valley.....	23.4	15.4	— 8.0
Northern slope.....	22.4	23.6	+ 1.2
Middle slope.....	31.2	32.3	+ 1.1
Southern slope.....	41.6	43.6	+ 2.0
Southern plateau.....	43.1	47.3	+ 4.2
Middle plateau.....	32.4	36.8	+ 4.4
Northern plateau.....	39.5	35.2	— 4.3
North Pacific coast region.....	44.2	45.7	+ 1.5
Middle Pacific coast region.....	49.4	51.0	+ 1.6
South Pacific coast region.....	55.5	57.0	+ 1.5

## RANGES OF TEMPERATURE.

The monthly, and the greatest and least daily, ranges of temperature, are given in the table of miscellaneous meteorological data.

The following are some of the greatest and least monthly ranges at Signal Service stations:

Greatest.		Least.	
	°		°
Fort Assinaboine, Montana.....	98.9	Astoria, Oregon.....	20.0
Bismarck, Dakota.....	80.9	Fort Canby, Washington Ter.....	21.3
Huron, Dakota.....	80.2	Cape Mendocino, California.....	21.5
Fort Maginnis, Montana.....	78.4	San Francisco, California.....	22.7
Fort Buford, Dakota.....	78.2	Tatoosh Island, Washington Ter.....	26.5
Poplar River, Montana.....	78.0	Key West, Florida.....	27.3

Table of comparative maximum and minimum temperatures for December.

State or Territory.	Station.	For 1886.		Since establishment of station.			
		Max.	Min.	Max.	Year.	Min.	Year.
Alabama.....	Mobile.....	69.0	22.9	78.8	1884	14.0	1880
Do.....	Montgomery.....	66.8	22.1	77.1	1884	8.0	1880
Arizona.....	Prescott.....	64.1	21.6	70.0	1881	18.0	1879
Do.....	Fort Apache.....	67.3	18.5	70.0	1882	8.0	1884
Arkansas.....	Fort Smith.....	63.8	7.7	80.0	1873	9.0	1876
Do.....	Little Rock.....	65.0	14.7	74.4	1880	6.0	1880
California.....	San Francisco.....	60.0	43.3	68.0	1878	34.0	1879
Do.....	San Diego.....	75.5	40.5	82.0	1874	32.0	1879
Colorado.....	Denver.....	64.8	1.4	74.1	1885	25.0	1870
Do.....	Pike's Peak.....	23.1	8.6	30.0	1877	37.0	1878
Connecticut.....	New Haven.....	55.6	6.9	62.0	1875	9.5	1884
Do.....	New London.....	54.1	10.3	60.5	1879	7.5	1883
Dakota.....	Fort Buford.....	45.3	32.9	59.3	1885	46.0	1879
Do.....	Yankton.....	49.0	22.7	62.0	1875	34.0	1879
Delaware.....	Del. Breakwater.....	49.1	12.1	69.0	1881	1.0	1880
Do.....	Cape Henlopen.....	54.2	10.8	73.0	1873	13.0	1880
District of Columbia.....	Washington City.....	75.8	27.4	81.0	1875	19.0	1880
Florida.....	Jacksonville.....	82.5	55.2	88.0	1876	44.0	1876
Do.....	Key West.....	84.6	14.9	71.0	1879	1.0	1880
Georgia.....	Savannah.....	74.0	25.0	80.0	1875	15.0	1880
Idaho.....	Boise City.....	60.2	21.2	60.5	1885	7.3	1884
Illinois.....	Chicago.....	57.2	11.3	72.0	1875	7.0	1872
Do.....	Chicago.....	59.8	9.5	68.0	1875	23.0	1872
Indiana.....	Indianapolis.....	57.7	3.5	68.0	1875	15.0	1876
Indian Territory.....	Fort Sill.....	69.0	3.1	77.0	1880	2.0	1879, 1880
Iowa.....	Dubuque.....	50.4	23.5	57.7	1883	19.0	76, 79, '80
Do.....	Des Moines.....	54.2	19.5	57.0	1883	18.2	1884
Kansas.....	Dodge City.....	63.0	5.0	73.0	1875	15.0	1876
Do.....	Leavenworth.....	58.7	10.4	72.0	1875	13.0	1872
Louisiana.....	New Orleans.....	72.4	27.0	78.0	1871, 1875,	20.0	1870, 1880
Do.....	Shreveport.....	72.0	20.2	79.0	1875	10.0	1880
Maine.....	Eastport.....	46.6	9.0	54.0	1877	21.0	1884
Do.....	Portland.....	49.6	4.0	59.0	1884	17.0	1872
Maryland.....	Baltimore.....	52.2	15.0	71.0	1881	3.0	1880
Massachusetts.....	Boston.....	54.9	6.0	66.0	1881	12.0	1880
Michigan.....	Detroit.....	51.8	2.5	65.0	1875	24.0	1872
Do.....	Alpena.....	52.6	1.7	56.0	1875	15.0	1880
Minnesota.....	Duluth.....	42.0	20.8	51.0	1883	34.0	1879
Do.....	Saint Paul.....	42.7	23.7	56.0	1877	39.0	1879
Mississippi.....	Vicksburg.....	69.1	19.2	79.0	1875	12.0	1880
Missouri.....	Saint Louis.....	61.1	19.2	74.0	1875	17.0	1882
Montana.....	Fort Benton.....	55.8	15.5	73.3	1885	59.0	1880
Do.....	Helena.....	55.8	15.5	56.8	1885	40.0	1880
Nebraska.....	North Platte.....	57.0	6.8	69.0	1885	27.0	1879
Do.....	Omaha.....	61.0	17.7	61.0	1877	17.0	1879, 1880
Nevada.....	Winnemucca.....	61.3	15.8	65.0	1878	20.0	1879
New Hampshire.....	Mount Washington.....	32.4	25.2	43.0	1884	47.0	1876
New Jersey.....	Atlantic City.....	51.4	13.7	64.0	1877	7.0	1880
Do.....	Sandy Hook.....	54.0	13.3	65.0	1878	13.0	1879
New Mexico.....	Santa Fe.....	48.2	4.1	70.0	1875	11.0	1871
New York.....	Rochester.....	54.2	14.0	66.2	1881	6.0	1880
Do.....	New York City.....	61.9	17.5	71.0	1884	5.0	1880
North Carolina.....	Charlotte.....	69.2	22.2	78.0	1879	10.0	1880
Do.....	Wilmington.....	60.4	2.6	72.0	1875	8.0	1872
Ohio.....	Cincinnati.....	52.6	0.3	68.0	1875	12.0	1872, 1880
Do.....	Cleveland.....	65.4	29.7	63.0	1875	3.0	1879
Oregon.....	Portland.....	65.8	31.5	65.0	1880	7.0	1879
Do.....	Roseburg.....	58.5	6.8	72.8	1885	9.0	1880
Pennsylvania.....	Pittsburg.....	55.3	12.9	70.0	1873	5.0	1880
Do.....	Philadelphia.....	54.3	15.5	60.0	1884	3.2	1884
Rhode Island.....	Block Island.....	71.8	24.8	75.0	1881	13.0	1880
South Carolina.....	Charleston.....	57.7	6.4	76.0	1874	5.0	1880
Tennessee.....	Knoxville.....	66.0	17.0	74.0	1875	3.0	1876, 1880
Do.....	Memphis.....	79.6	26.5	82.9	1885	18.0	1880
Texas.....	Brownsville.....	71.3	2.4	83.0	1880	10.0	1879
Do.....	Fort Elliott.....	55.7	19.0	61.0	1874	10.0	1879
Utah.....	Salt Lake City.....	56.0	15.0	73.0	1873	5.0	1880
Virginia.....	Lynchburg.....	66.1	19.8	73.0	1873, 1874,	6.0	1880
Do.....	Norfolk.....	57.2	14.4	57.1	1885	17.8	1884
Washington Ter.....	Spokane Falls.....	60.2	31.0	64.2	1885	8.0	1879, 1884
Do.....	Olympia.....	48.0	14.9	60.0	1877	37.0	1884
Wisconsin.....	La Crosse.....	47.6	17.3	63.0	1877	21.6	1884
Do.....	Milwaukee.....	47.6	17.3	63.0	1877	21.6	1884
Wyoming.....	Cheyenne.....	64.2	18.5	64.2	1875	24.0	1879, 1880

## DEVIATIONS FROM NORMAL TEMPERATURES.

In the table below are given, for certain stations, as reported by voluntary observers, the normal temperatures for December for a series of years, the mean temperature for December, 1886, and the departures from the normal:

Station.	County.	Normal temperature for December.	Number of years.	Mean temperature for Dec., 1886.	Departure.
Arkansas.					
Lead Hill.....	Boone.....	37.9	5	32.5	- 5.4
California.					
Fall Brook.....	San Diego.....	52.5	10	53.9	+ 1.4
Sacramento.....	Sacramento.....	46.2	21	47.3	+ 1.1
Connecticut.					
Middletown *.....	Middlesex.....	28.3	28	24.6	- 3.7
New Haven *.....	New Haven.....	30.7	100	27.3	- 3.4
Thompson *.....	Windham.....	27.7	30	24.0	- 3.7
Illinois.					
Anna.....	Union.....	37.5	11	30.4	- 7.1
Mattoon.....	Colos.....	30.0	6	25.0	- 5.0
Peoria.....	Peoria.....	28.6	30	23.0	- 5.6
Riley.....	McHenry.....	21.7	25	15.4	- 6.3
Sycamore.....	De Kalb.....	24.1	6	17.0	- 7.1
Indiana.					
Lafayette.....	Tippecanoe.....	26.6	7	22.5	- 4.1
Logansport.....	Cass.....	28.0	32	24.2	- 3.8
Mauzy.....	Rush.....	26.4	7	20.4	- 6.0
Vevay.....	Switzerland.....	34.6	21	29.6	- 5.0
Iowa.					
Monticello.....	Jones.....	21.5	33	14.2	- 7.3
Muscatine.....	Muscatine.....	23.8	47	10.6	- 13.2
Kansas.					
Independence.....	Montgomery.....	34.1	14	28.3	- 5.8
Lawrence.....	Douglas.....	29.6	19	24.0	- 5.6
Wollington.....	Sumner.....	30.8	8	28.3	- 2.5
Yates Centre.....	Woodson.....	29.4	7	25.5	- 3.9
Louisiana.					
Grand Coteau.....	Saint Landry.....	55.2	3	52.2	- 3.0
Maine.					
Belfast *.....	Waldo.....	23.3	27	20.9	- 2.4
Bridgeton *.....	Cumberland.....	22.5	12	18.5	- 4.0
Cornish.....	York.....	22.7	29	20.0	- 2.7
Gardner *.....	Kennebec.....	22.4	51	23.3	+ 0.9
Orono *.....	Penobscot.....	20.8	18	18.1	- 2.7
Michigan.					
Thornville.....	Lapeer.....	28.6	10	19.6	- 9.0
Maryland.					
Fallston.....	Harford.....	33.3	16	28.6	- 4.7
Massachusetts.					
Anthorst *.....	Hampshire.....	26.7	49	25.6	- 1.1
Cambridge *.....	Middlesex.....	29.1	64	27.4	- 1.7
Fitchburg *.....	Worcester.....	25.7	30	23.7	- 2.0
Lowell *.....	Middlesex.....	27.9	15	21.6	- 6.3
New Bedford *.....	Bristol.....	31.9	75	29.9	- 2.0
Somerset *.....	Bristol.....	30.0	16	28.4	- 1.6
Springfield *.....	Hampden.....	27.6	20	25.6	- 2.0
Taunton *.....	Bristol.....	30.5	16	27.7	- 2.8
Williamstown *.....	Berkshire.....	26.3	32	22.1	- 4.2
Nevada.					
Carson City.....	Ormsby.....	36.4	7	40.8	+ 4.4
New Brunswick.					
Saint John *.....	Saint John.....	22.6	26	23.2	+ 0.6
New Hampshire.					
Concord *.....	Merrimac.....	26.3	19	23.7	- 2.6
Hanover *.....	Grafton.....	20.7	25	16.1	- 4.6
New Jersey.					
South Orange.....	Essex.....	29.7	17	29.8	+ 0.1
New York.					
Factoryville.....	Tioga.....	27.5	5	22.3	- 5.2
North Volney.....	Oswego.....	25.5	19	21.5	- 4.0
Palermo.....	Oswego.....	24.2	33	19.3	- 4.9
Ohio.					
Wauseon.....	Fulton.....	26.7	16	19.3	- 7.4
Pennsylvania.					
Dyberry.....	Wayne.....	24.9	22	21.5	- 3.4
South Carolina.					
Stateburg.....	Sumter.....	47.1	6	43.9	- 3.2
Texas.					
New Ulm.....	Austin.....	53.9	14	52.7	- 1.2
Vermont.					
Lunenburg *.....	Essex.....	20.8	38	15.9	- 4.9
Newport *.....	Orleans.....	20.2	12	15.6	- 4.6
Stratford.....	Orange.....	21.1	12	17.3	- 3.8
Virginia.					
Bird's Nest.....	Northampton.....	41.6	18	39.0	- 2.6
Dale Enterprise.....	Rockingham.....	38.6	6	31.4	- 7.2
Variety Mills.....	Nelson.....	36.9	10	30.6	- 6.3
West Virginia.					
Helvetia.....	Randolph.....	33.6	10	28.9	- 4.7
Wisconsin.					
Delavan.....	Walworth.....	19.8	3	15.8	- 4.0

\* From the "Bulletin of the New England Meteorological Society."

The following notes on the temperature of December and the year 1886 are given by voluntary observers:

California.—Sacramento: the mean temperature of 1886, 59°.4, is 0°.7 below the average of the past twenty-one years.

Illinois.—Riley, McHenry county: the mean temperature of the present December, 15°.4, is lower, with the exception of that of 1872 and 1876, than that of any other December during the past twenty-five years; in that time the warmest December occurred in 1877, mean temperature, 37°.8; the coldest

in 1876, mean, 11°.1. The mean temperature of 1886, 44°.8, is only 0°.2 lower than the normal of the past twenty-three years; in that time 1870 was the warmest year, mean temperature, 48°.1; 1875 was the coldest, mean, 41°.4.

Sycamore, DeKalb county: the mean temperature of 1886, 45°.2, coincides with the annual mean of the past five years. The temperature of the present December, 17°.0, is lower than that of any other December during the past six years; in that time the warmest December occurred in 1881, mean, 34°.8.

Sandwich, DeKalb county: the mean annual temperature of the past thirty-five years is 47°.8, the mean of 1886 is 48°.7, being 0°.9 above the normal; the maximum temperature of the past thirty-five years is 105°.0, the minimum is -34°.0; the maximum of 1886 is 99°.0, the minimum is -25°.0.

Indiana.—Logansport, Cass county: the highest December temperature since the beginning of observations in 1854, 72°.0, occurred in 1875, the lowest, -22°.0, in 1872; the highest mean temperature for that month, 45°.0, occurred in 1877; the lowest, 14°.0, in 1872; greatest monthly range, 79°.0, in 1870; least monthly range, 38°.0, in 1857; the highest temperature during 1886, 103°.0, occurred July 7th, the lowest, -17°.0, January 10th; the mean temperature for the year is 51°.6.

Vevay, Switzerland county: the three highest temperatures that have occurred in December during the past twenty-one years are 76°.0 in 1865, 73°.0 in 1875, 72°.0 in 1867; the three lowest are -11°.0 in 1880, -7°.0 in 1871 and 1876.

Iowa.—Muscatine, Muscatine county: the present December is the coldest that has occurred during the past forty-seven years; it is 13°.2 below the normal and 3°.8 below the mean of December, 1872, which is second to the present December in point of low temperature; the minimum temperature of the month, -26°.0, was reached but once before, viz., in 1872.

Monticello, Jones county: the mean temperature of the year, 45°.9, is 0°.4 below the normal of the past thirty-two years; during December since 1854 the maximum temperature, 64°.0, occurred in 1877; the minimum, -36°.0, in 1872; the warmest December mean temperature, 39°.5, occurred in 1877; the coldest mean, 8°.1, in 1859.

Kansas.—Lawrence, Douglas county: the following table, by Prof. F. H. Snow, furnishes a comparison with the eighteen preceding Decembers:

	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.
Mean temp.....	23.9	29.6	28.4	24.4	19.8	31.1	30.8	39.4	23.6	44.4
Max. temp.....	53.0	65.0	64.0	58.0	58.5	67.5	55.5	73.0	66.0	68.0
Min. temp.....	-16.0	4.0	-10.0	-6.0	-18.0	9.0	-3.0	0.0	-5.0	10.0

	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	Mean.
Mean temp.....	23.0	26.2	25.8	40.1	31.2	33.7	23.5	32.5	24.0	29.2
Max. temp.....	53.0	65.5	61.0	63.0	58.0	63.0	59.5	57.0	58.0	61.4
Min. temp.....	-6.0	-9.0	-12.0	13.0	-6.5	3.5	-6.5	-1.5	-6.0	-3.3

Maine.—Cornish, York county: during the past twenty-nine years the coldest December occurred in 1859, mean temperature, 14°.7; the warmest in 1877, mean, 27°.5.

Massachusetts.—Somerset, Bristol county: the mean temperature of 1886, 50°.2, is 0°.7 above the average of the past sixteen years.

Worcester, Worcester county: the mean temperature of 1886 was 45°.1 against 44°.0 and 45°.8 the two preceding years. The extremes of temperature were -9°.0, February 7th, which was the coldest day of the year (with a mean temperature of -4°.5) and 89°, on July 6th and 7th, the latter being the warmest day, with a mean temperature of 78°.7. The extremes of temperature during the last half century are, the minimum, -18°.5, on February 8, 1861, and the maximum, 98°, on June 22, 1849. The coldest day during the period was February 5, 1855, when the extremes were -7° and -14°, with a mean temperature of -11°.2. The warmest day during the same period was July 13, 1849, when the extremes were 78° and 95°, with a mean temperature of 89°.2.

New York.—North Volney, Oswego county: during the past nineteen years the coldest December occurred in 1876, mean temperature, 18°.0; the warmest in 1881, mean, 33°.7; the mean temperature of 1886, 45°.1, is 0°.3 above the average of the past nineteen years.

Palermo, Oswego county: the highest December mean temperature during the past thirty-three years, 32°.1, occurred in 1881; the lowest mean, 16°.8, in 1880; the mean temperature of the year 1886, 42°.7, is 4°.2 below the average of the past thirty-three years; the highest yearly mean in that time, 51°.8, occurred in 1878.

Ohio.—Wauseon, Fulton county: during the past sixteen years the highest December mean temperature, 38°.8, occurred in 1877; the lowest, 17°.1, in 1872; the December extremes for the same period are 70°.0 in 1875 and -32°.4 in 1884; the mean temperature of the year 1886, 47°.4, is 0°.3 below the average.

Texas.—New Ulm, Austin county: temperature comparisons for December during the past fourteen years: highest mean, 60°.9, in 1875; lowest mean, 46°.1, in 1876; highest temperature, 86°.0, in 1875; lowest, 9°.0, in 1880.

Virginia.—Dale Enterprise, Rockingham county: the highest December mean temperature recorded at this place within the past six years, 51°.4, occurred in 1880; the lowest, 28°.4, in 1882. The table below gives the maxi-

mum, minimum, and annual mean temperature of each year from 1880 to 1886, inclusive:

Years.	Temperature.		
	Maximum of the year.	Minimum of the year.	Annual means.
1880.....	100	-17	55.4
1881.....	99	-13	55.2
1882.....	97	5	53.6
1883.....	98	0	55.0
1884.....	97	-3	53.2
1885.....	100	-10	53.2
1886.....	95	-12	55.7
Means.....	98	-7	54.6

Bird's Nest, Northampton county: during the past eighteen years the lowest December mean temperature, 32°.7, occurred in 1876.

Wytheville, Wythe county: during the past twenty-two years one December only, that of 1878, was colder than the present month.

Variety Mills, Nelson county: the mean temperatures of December, 1886 and 1876, were each 30°.3, and were lower than the mean of any other December in the past ten years; the highest mean in that time, 43°.3, occurred in 1879; the mean temperature for 1886, 52°.5, is 2°.7 below the average of the previous nine years, and it is also the lowest annual mean that has occurred in that time; 1877 and 1881 were the warmest, annual temperature for each, 56°.5; the maximum temperature of the year 1886, 93°.0, occurred July 30th; the minimum, -15°.6, on February 5th.

West Virginia.—Helvetia, Randolph county: the mean temperature of the year, 48°.9, is 1°.4 below the average of the last ten years.

#### FROSTS.

Frost occurred in the various districts on the following dates:

*New England.*—1st to 31st.

*Middle Atlantic states.*—1st to 31st.

*South Atlantic states.*—1st to 12th, 14th to 31st.

*Florida Peninsula.*—3d, 6th, 7th, 8th, 15th, 16th, 17th, 20th, 21st.

*East Gulf states.*—2d to 8th, 13th, 14th, 16th, 17th, 20th to 23d, 25th, 27th.

*West Gulf states.*—1st, 2d to 7th, 9th, 14th, 15th, 16th, 18th to 22d, 24th to 27th, 31st.

*Rio Grande Valley.*—5th, 6th.

*Tennessee.*—1st to 11th, 13th to 31st.

*Ohio Valley.*—1st to 22d, 24th to 31st.

*Lower lake region.*—1st to 31st.

*Upper lake region.*—1st to 31st.

*Extreme northwest.*—1st to 31st.

*Upper Mississippi valley.*—1st to 31st.

*Missouri Valley.*—1st to 31st.

*Northern slope.*—1st to 31st.

*Middle slope.*—1st to 31st.

*Southern slope.*—1st to 16th, 19th, 24th to 22d to 29th, 31st.

*Southern plateau.*—1st to 9th, 11th to 31st.

*Middle plateau.*—1st to 31st.

*Northern plateau.*—1st, 2d, 4th to 7th, 10th, 11th, 12th, 14th, 15th, 18th to 21st, 23d, 28th, 29th, 31st.

*North Pacific coast region.*—1st to 6th, 9th, 10th, 12th to 15th, 20th to 24th, 27th.

*Middle Pacific coast region.*—1st to 5th, 10th, 13th, 14th, 15th, 21st.

*South Pacific coast region.*—11th, 22d.

#### ICE.

Ice formed in the southern parts of the country, as follows:

*Florida.*—Jacksonville, 6th, 7th, 16th, 17th; Archer, 6th, 7th, 16th, 21st; Duke, 6th, 7th; Pensacola, 5th, 6th.

*Georgia.*—Savannah, 3d, 16th.

*Louisiana.*—New Orleans, 5th; Shreveport, 16th, 20th.

*North Carolina.*—Hatteras, 3d; Charlotte, 2d, 3d.

*South Carolina.*—Charleston, 16th, 17th.

*Texas.*—Palestine, 2d; Corsicana, 4th to 7th, 12th, 25th, 27th, 28th.

#### TEMPERATURE OF WATER.

The following table shows the highest and lowest temperatures of water observed at the several stations; the monthly